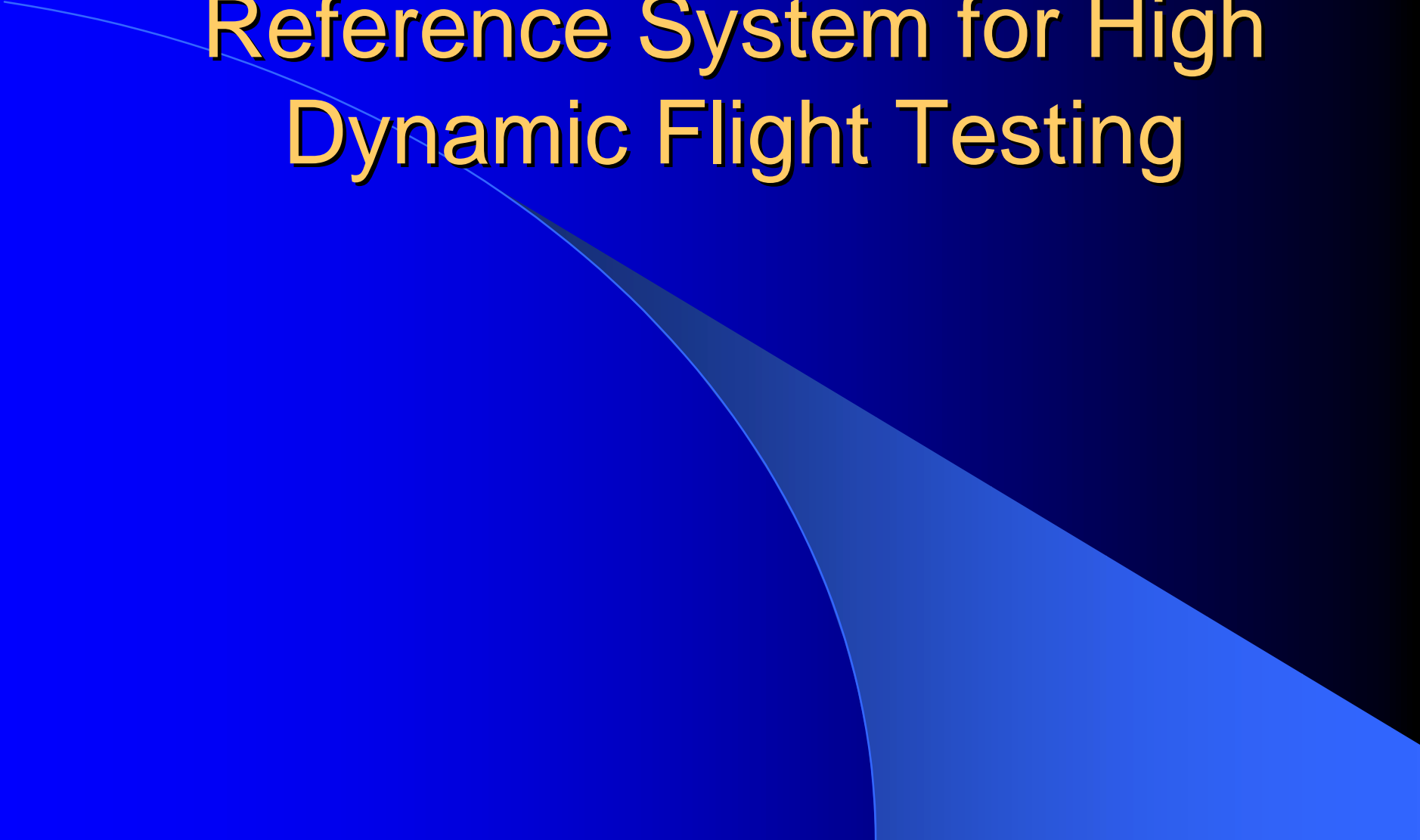


Evaluation of a Truth Reference System for High Dynamic Flight Testing

A decorative graphic element consisting of a large, curved, light blue shape that sweeps from the left side of the slide towards the bottom right corner, partially overlapping the dark blue background.

Truth Reference Evaluation

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Expanded Flight Testing

- High altitude (up to FL 390)
- High speed ($V_{ne} = 440$ kts)
- High dynamics (fully aerobatic)

Expanded Research Opportunities

- Space range safety test bed
- GPS acquisition and tracking under high dynamics
- GPS/INS testing
- Flight control research
- SAR test bed
- *Your* R&D flight test

AeroVodochody L-29 Delfin Specifications

- Max Gross Weight: 7826 lb
- Max Crew Weight: 250 lb ea.
- G-limits: +8, -4
- Fuselage Tanks: 1000 L / 264 G
- Wing Tanks: 300 L / 79 G

Specifications (cont'd)

- Takeoff speed: 100 kts
- Initial climb speed: 190 kts
- Vne: 440 kts (Mach 0.7)
- Cruise speed: 320 kts
- Fuel consumption: 150 gal/hr
- Length: 36'; Wingspan: 34'; Height: 10'

First Flight Test

- July 12, 2000
- Chillicothe, Ohio (RZT)
- Ashtech Z-12 (Ground and Air)
- Low Dynamics (static, taxi, take-off)
- Medium Dynamics (steep turns)
- High Dynamics (2g & 3g turns, aileron rolls)

Flight Test Goal

- Evaluate traditional GPS-based truth reference system
 - Survey-type, dual-frequency GPS receivers
 - Ashtech PNAV software set for ‘aircraft’ dynamics (note: low-dynamic photogrammetry profiles are expected with this mode)
 - Limitation: no truth reference to check the truth reference







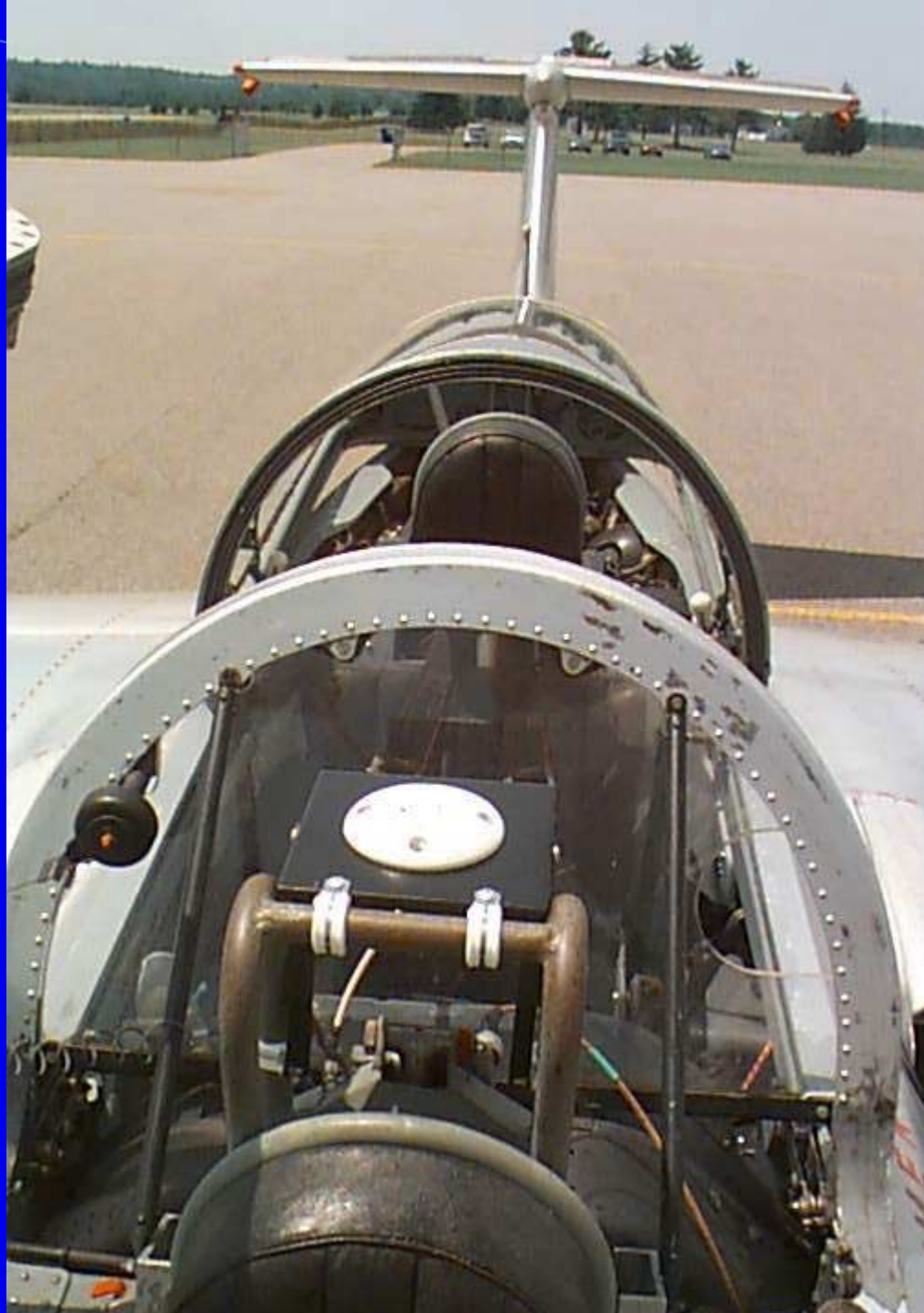




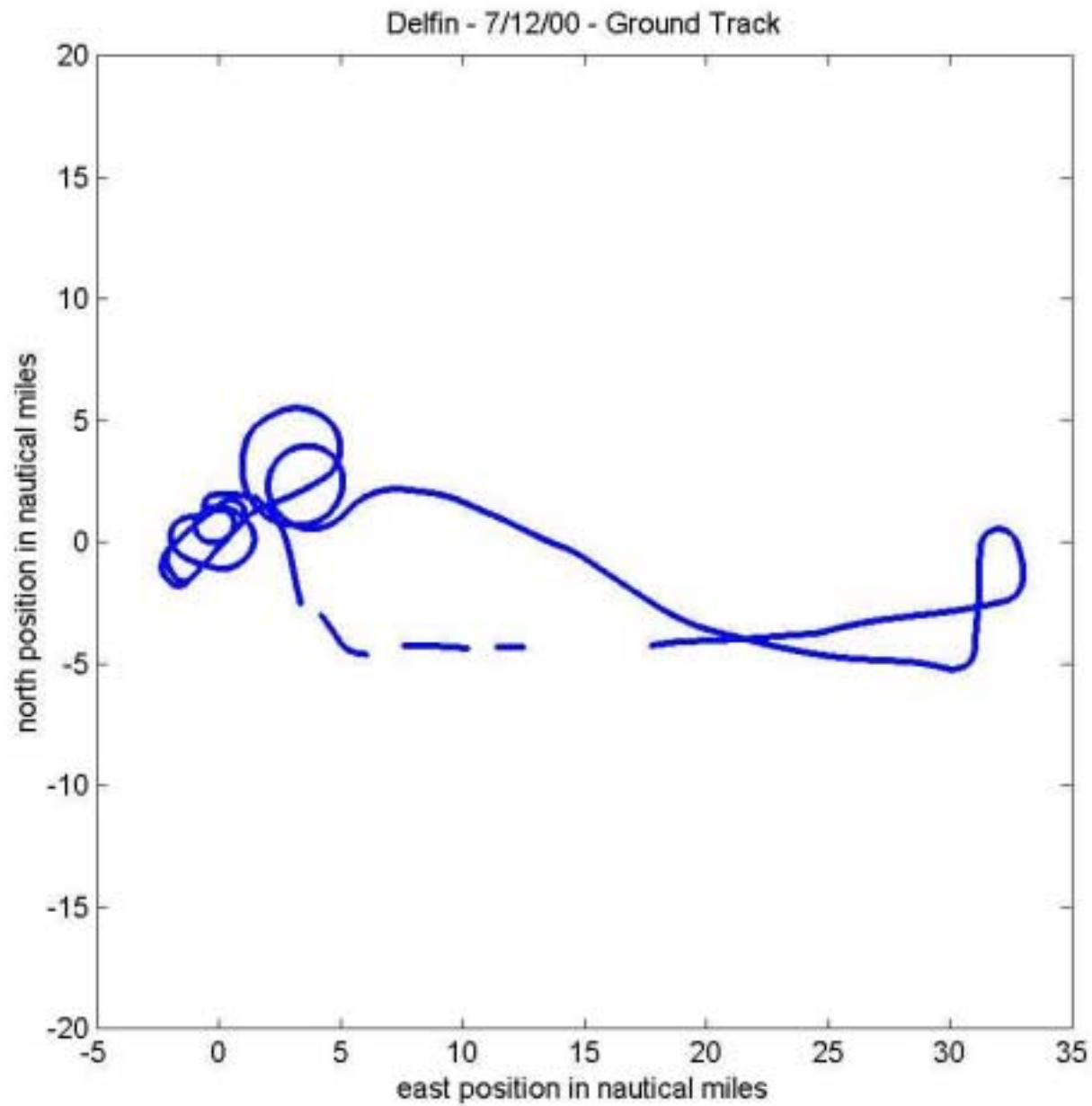


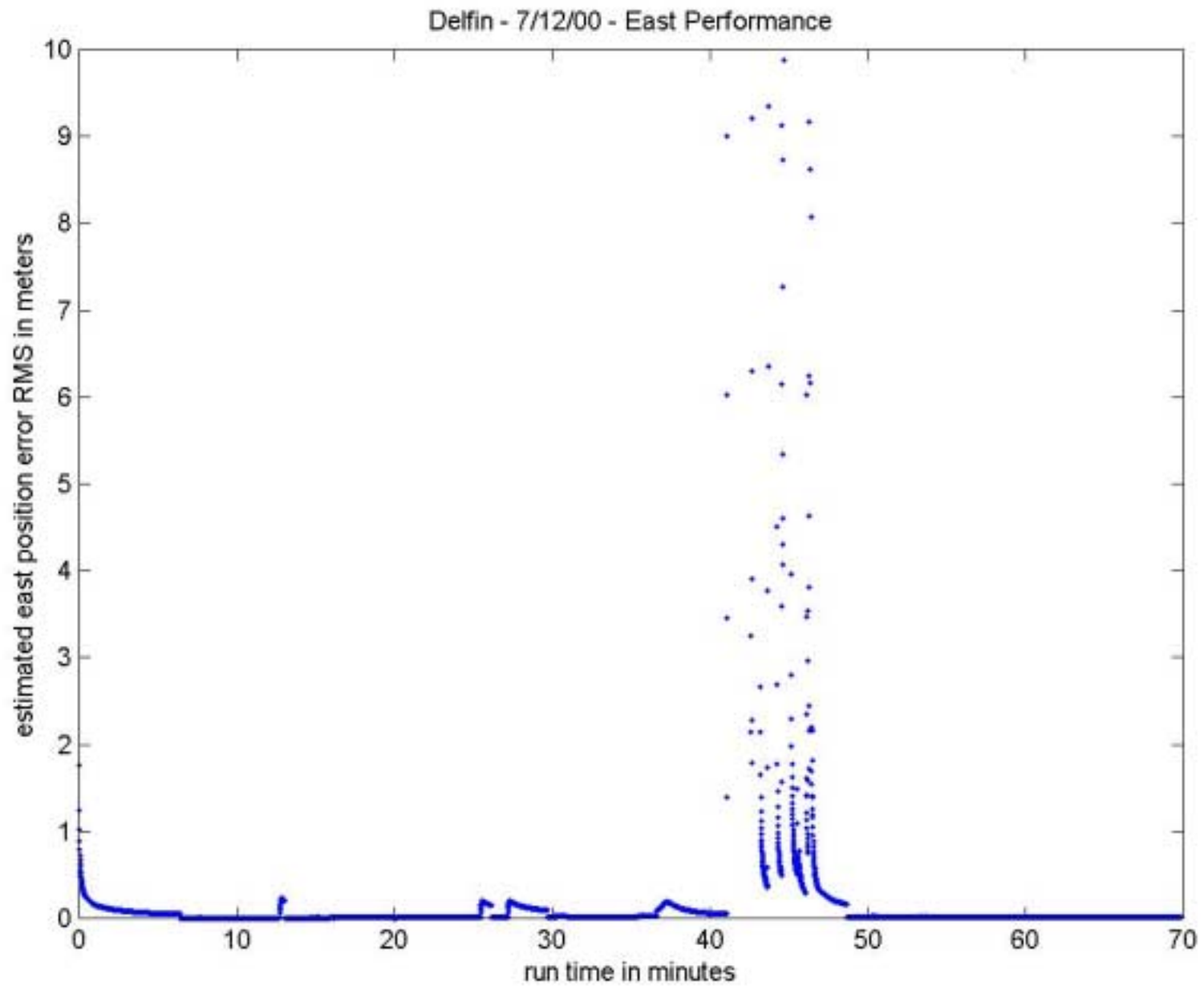


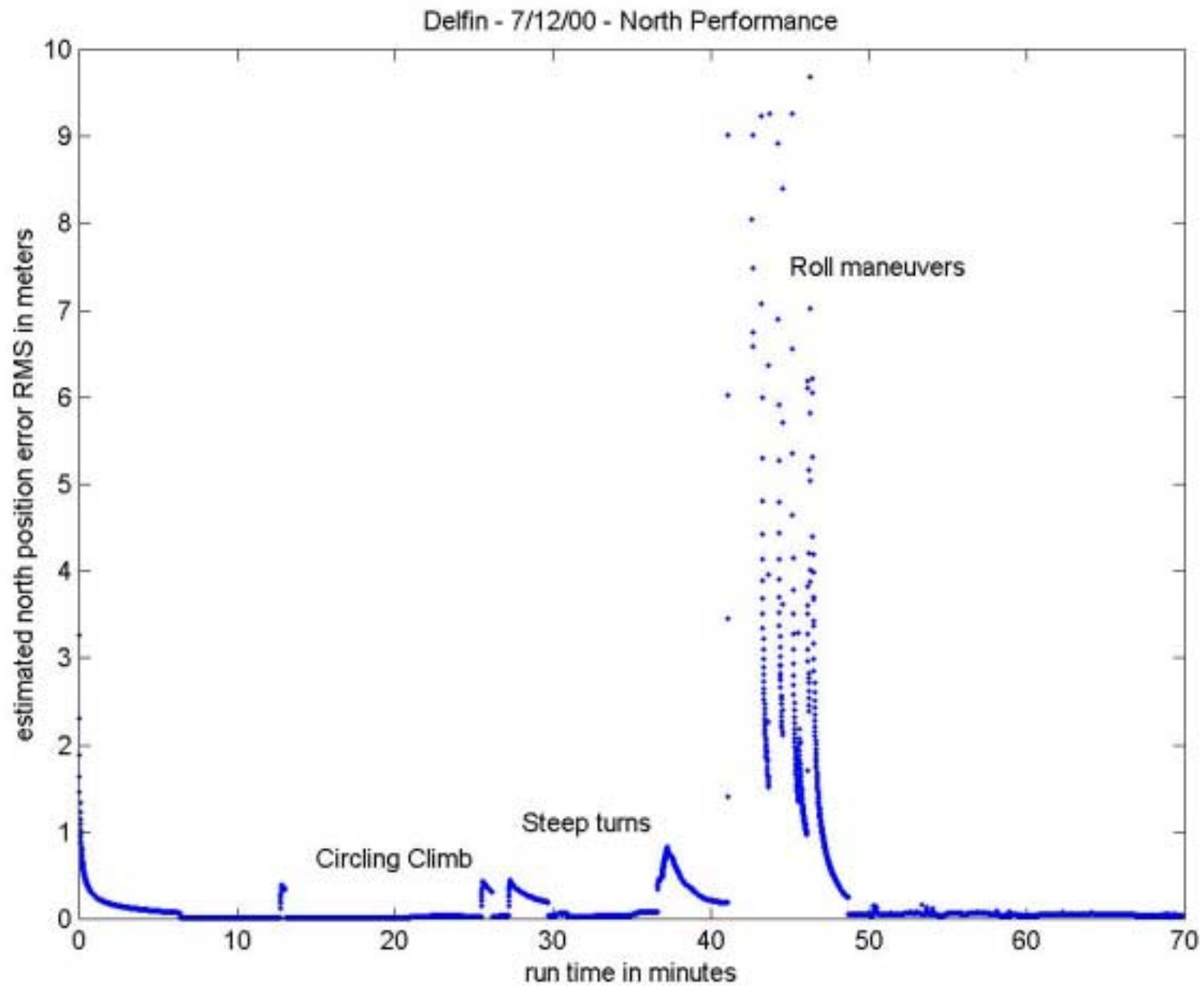


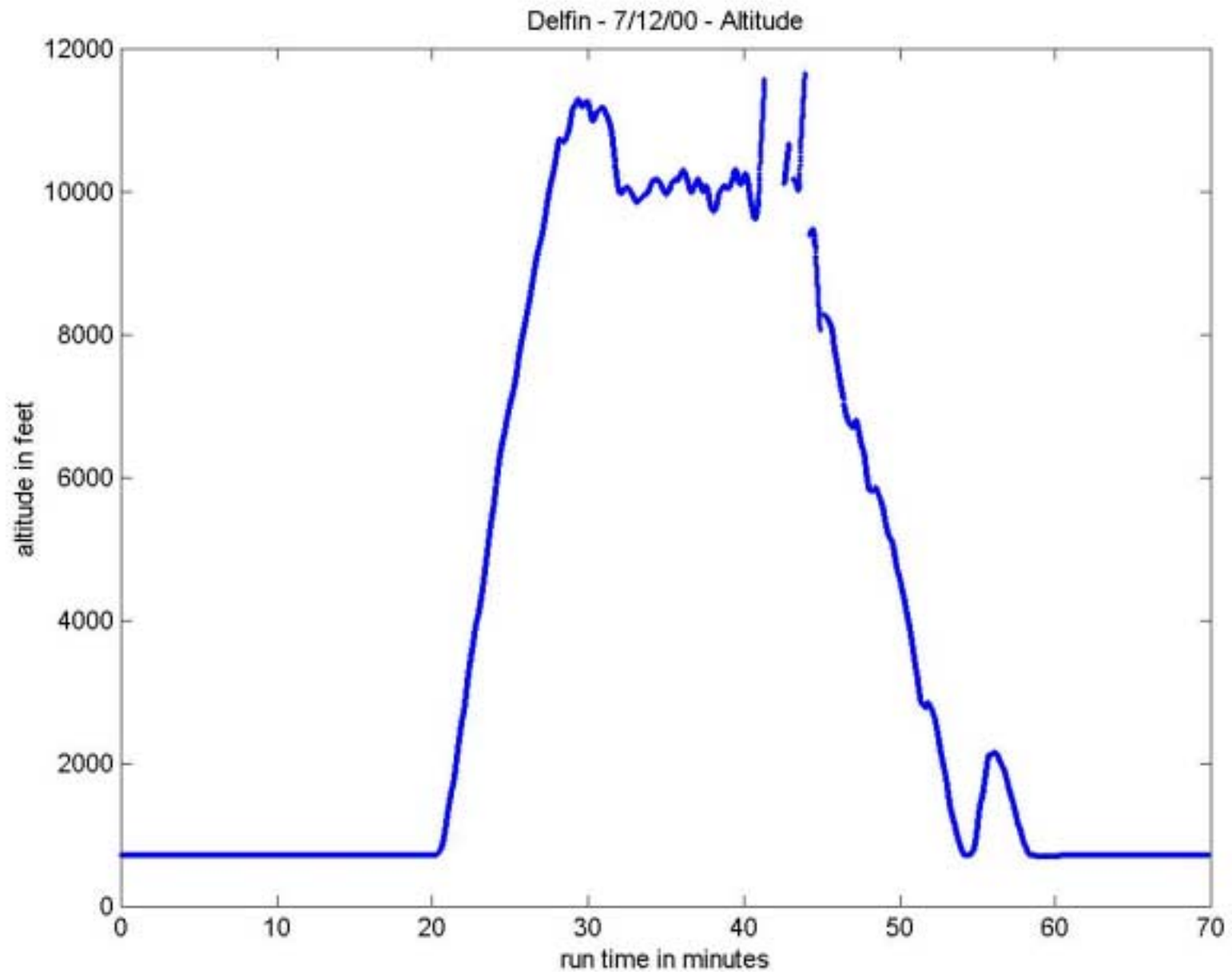


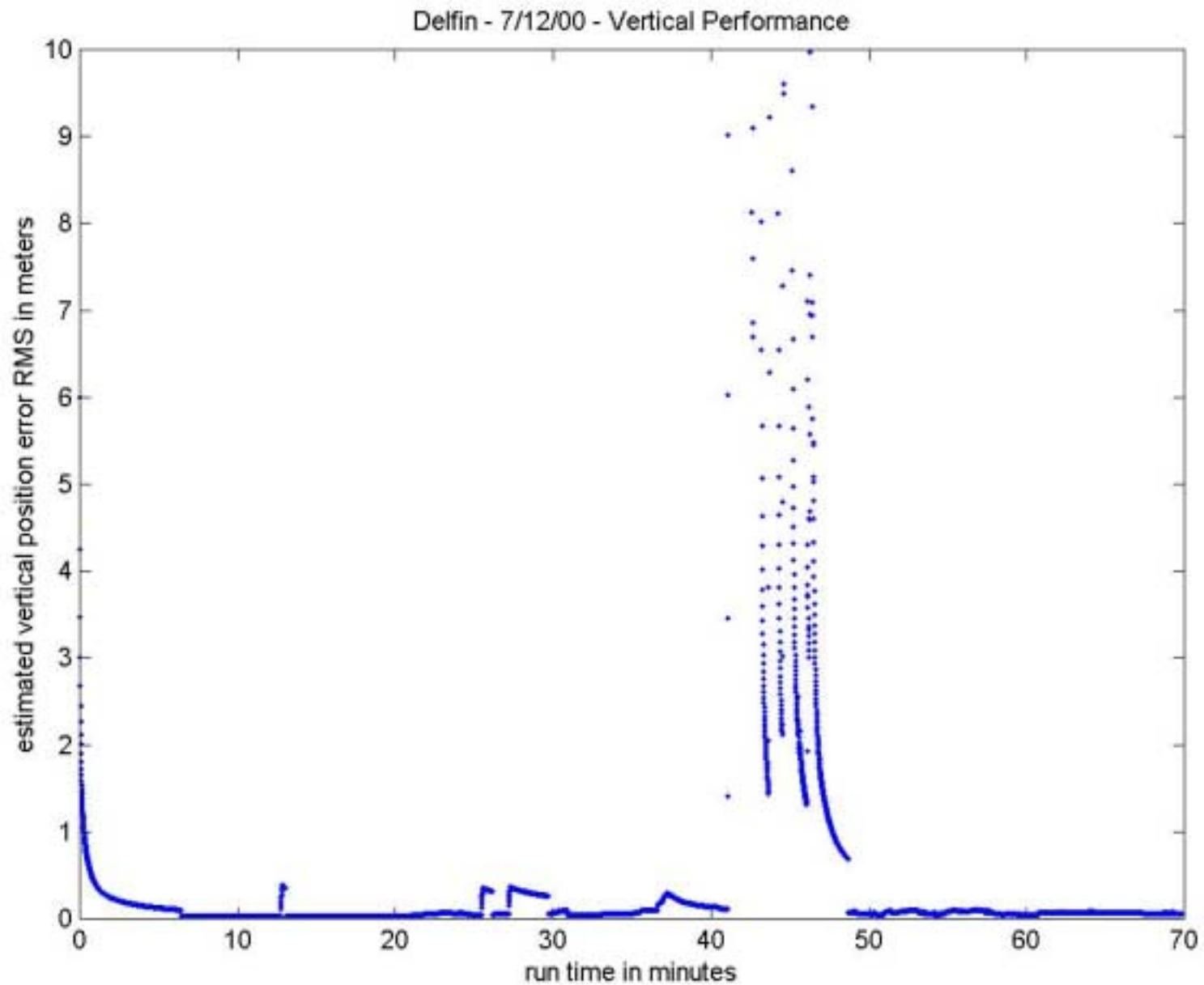


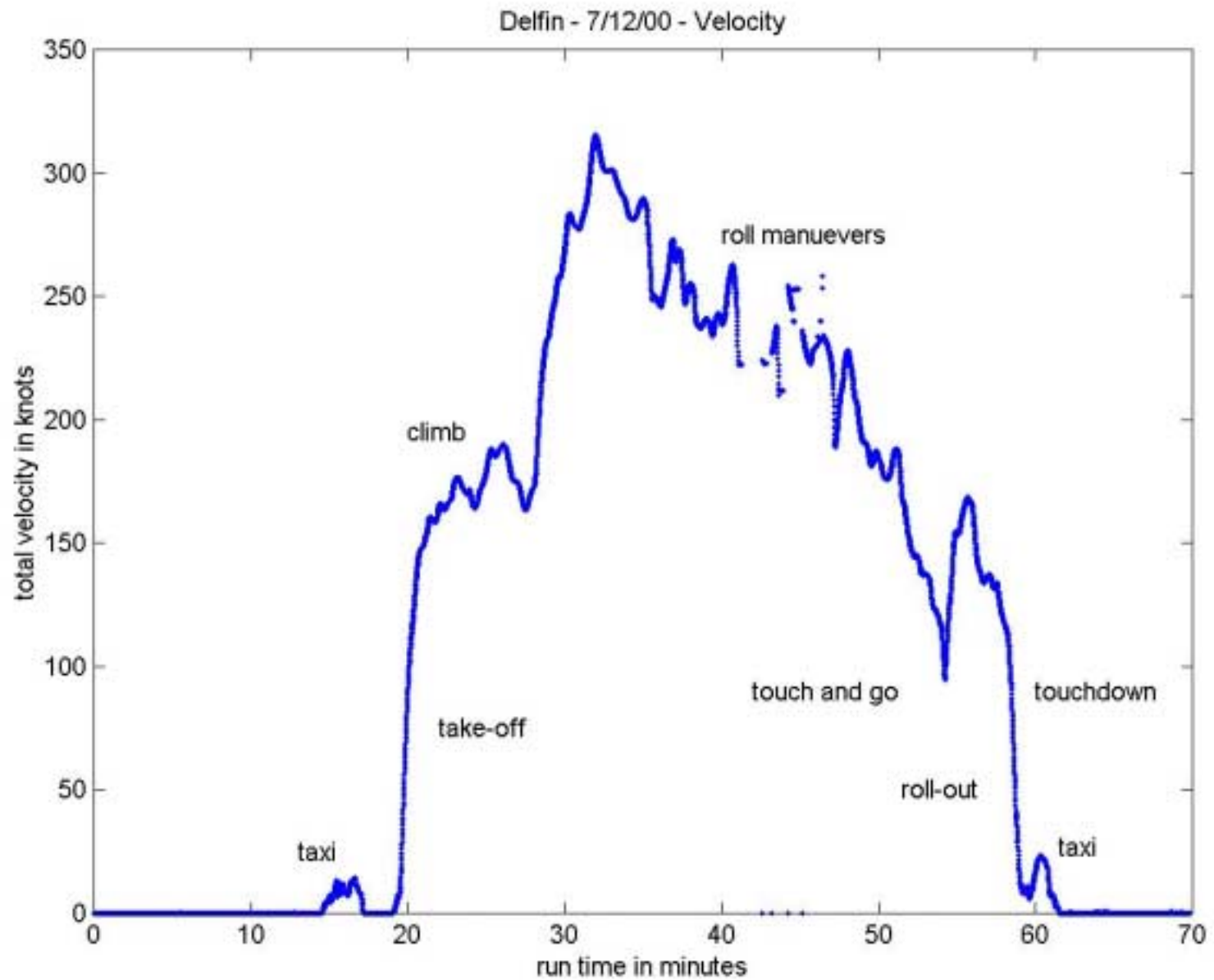


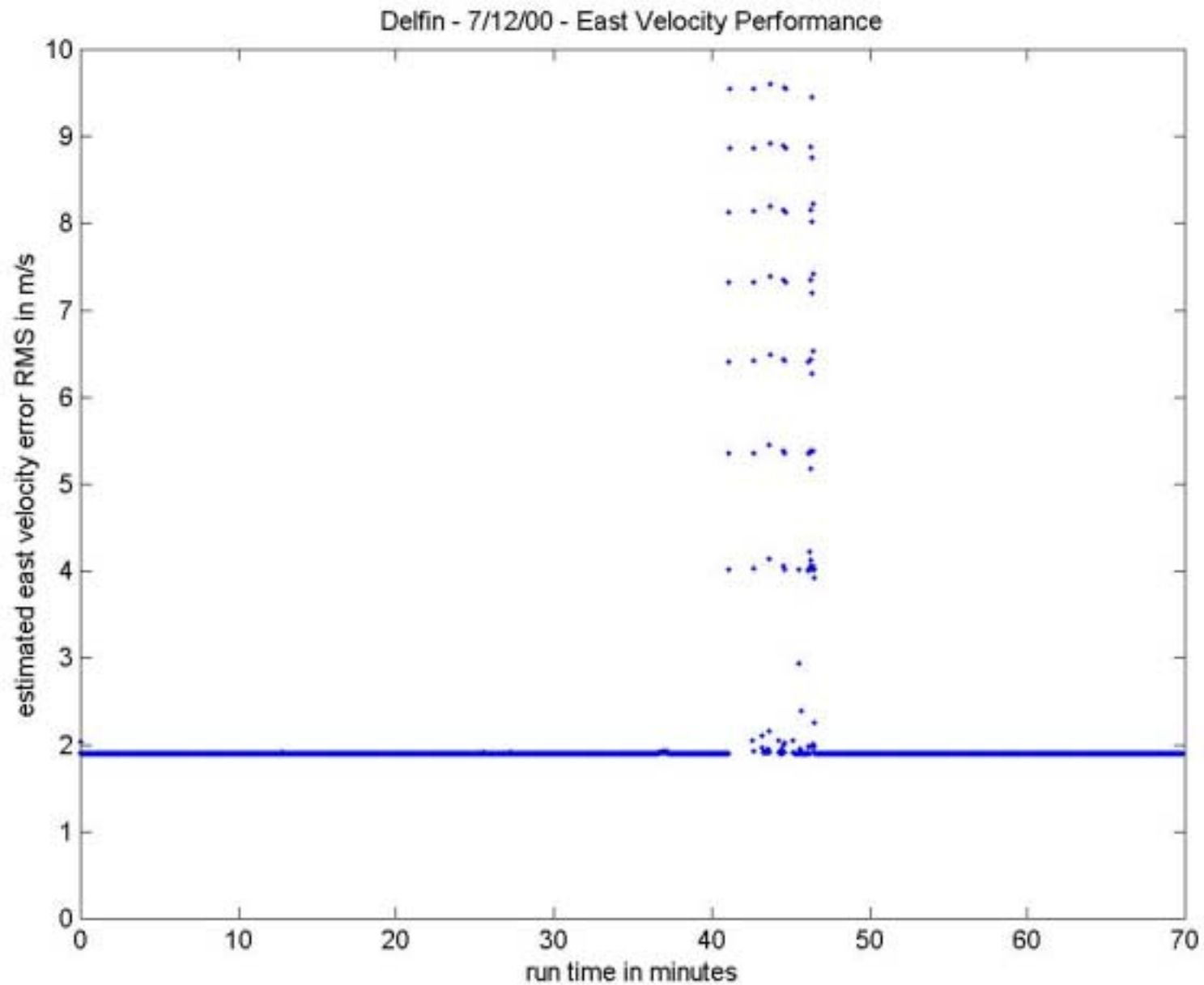


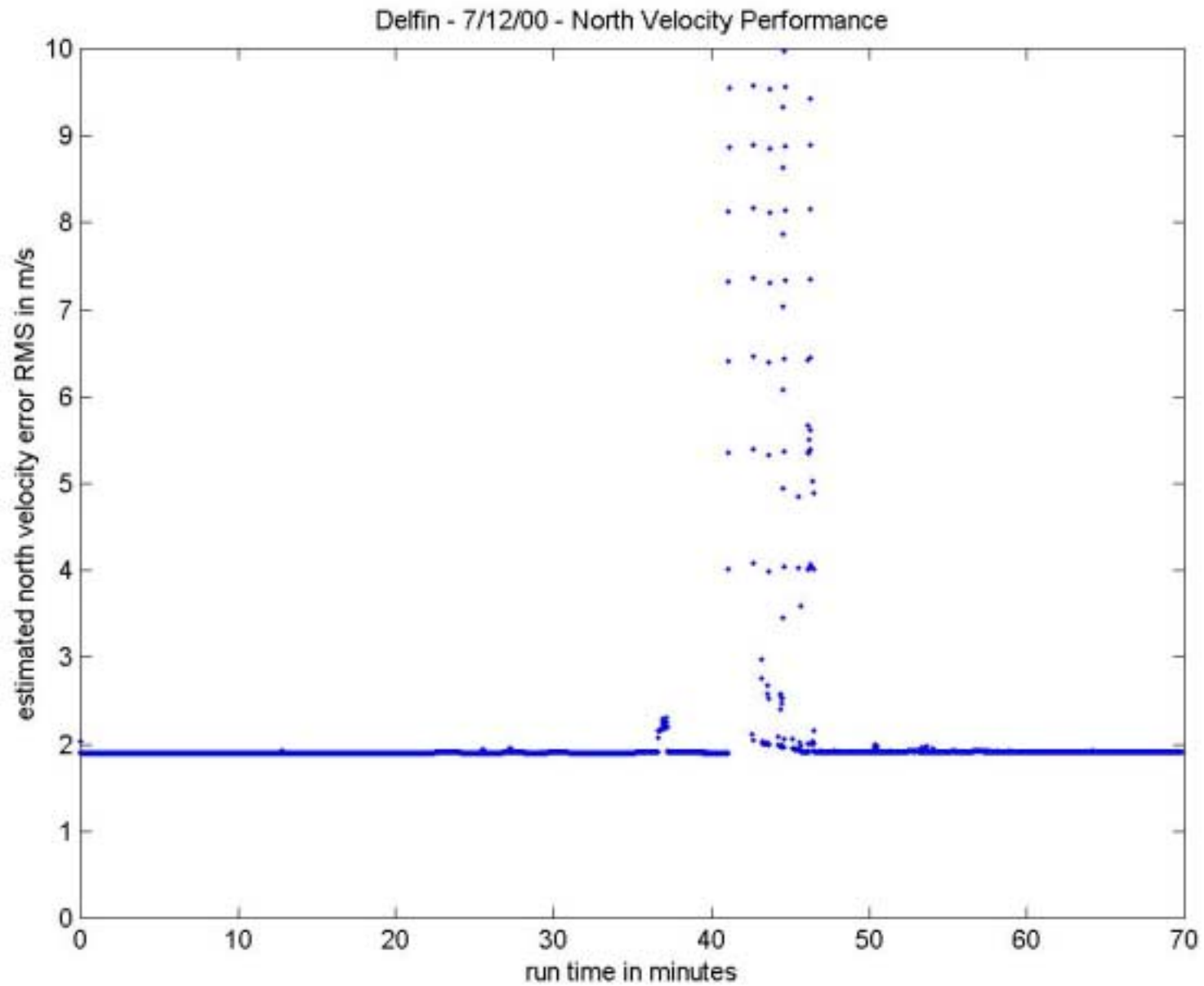


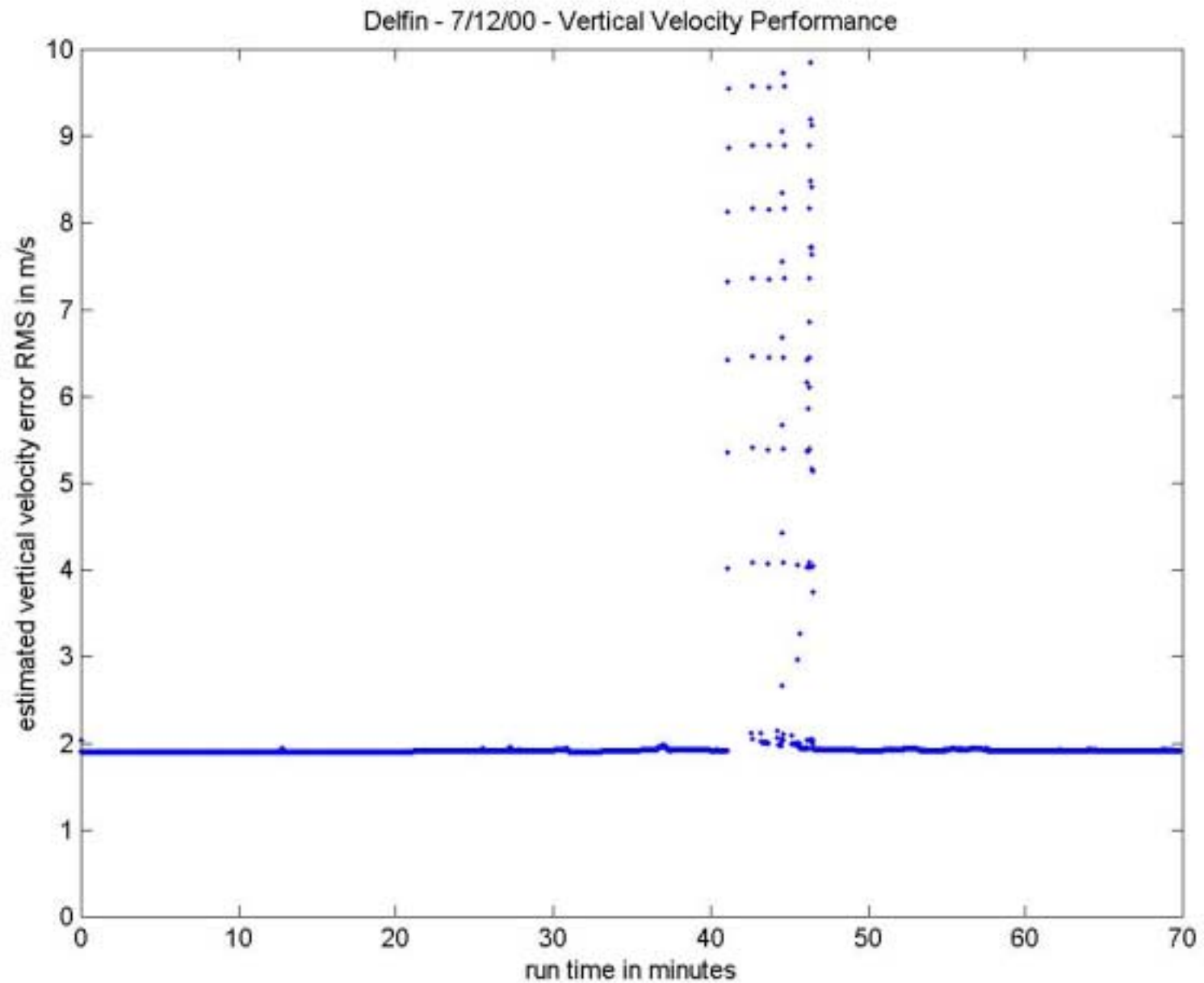


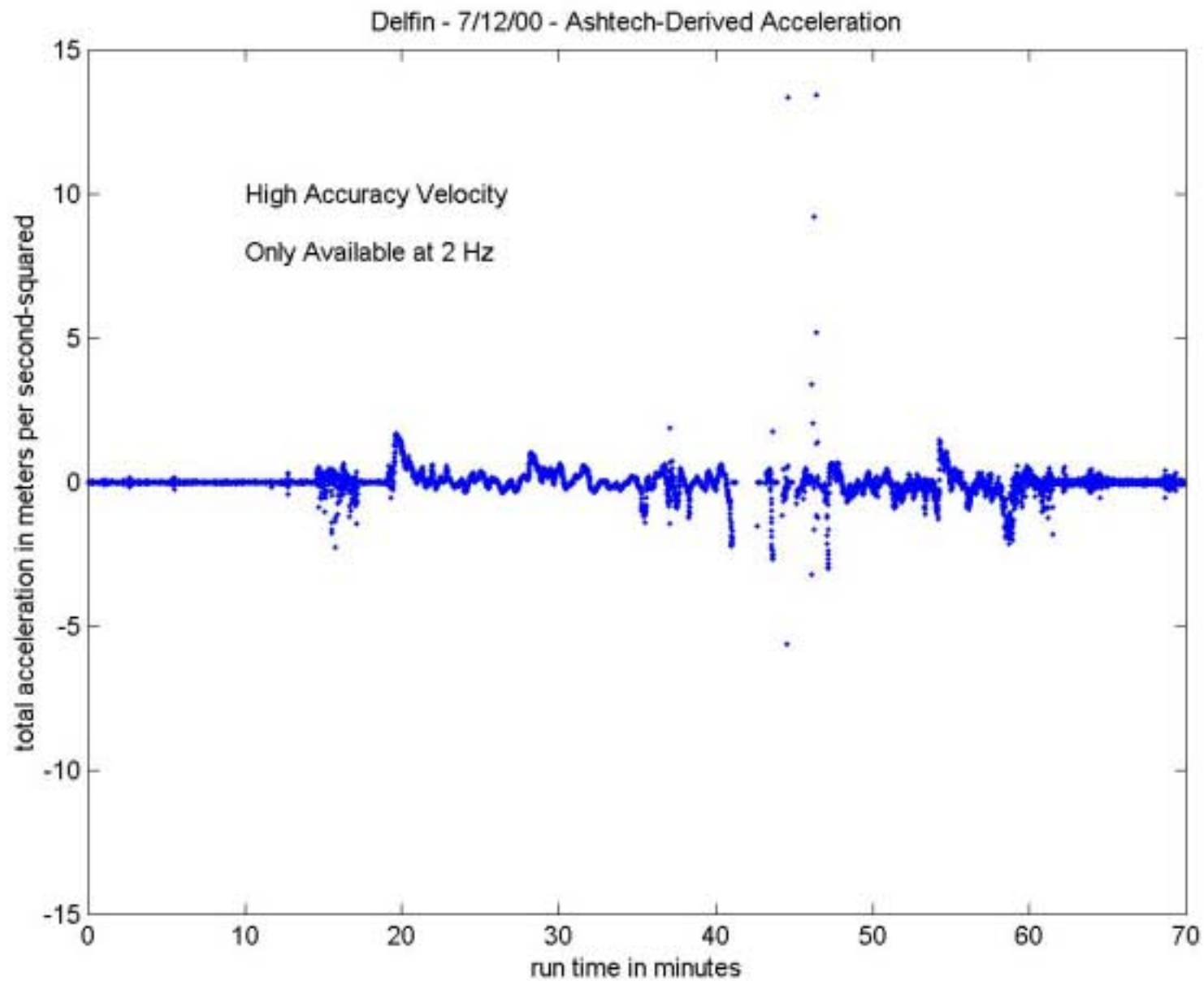


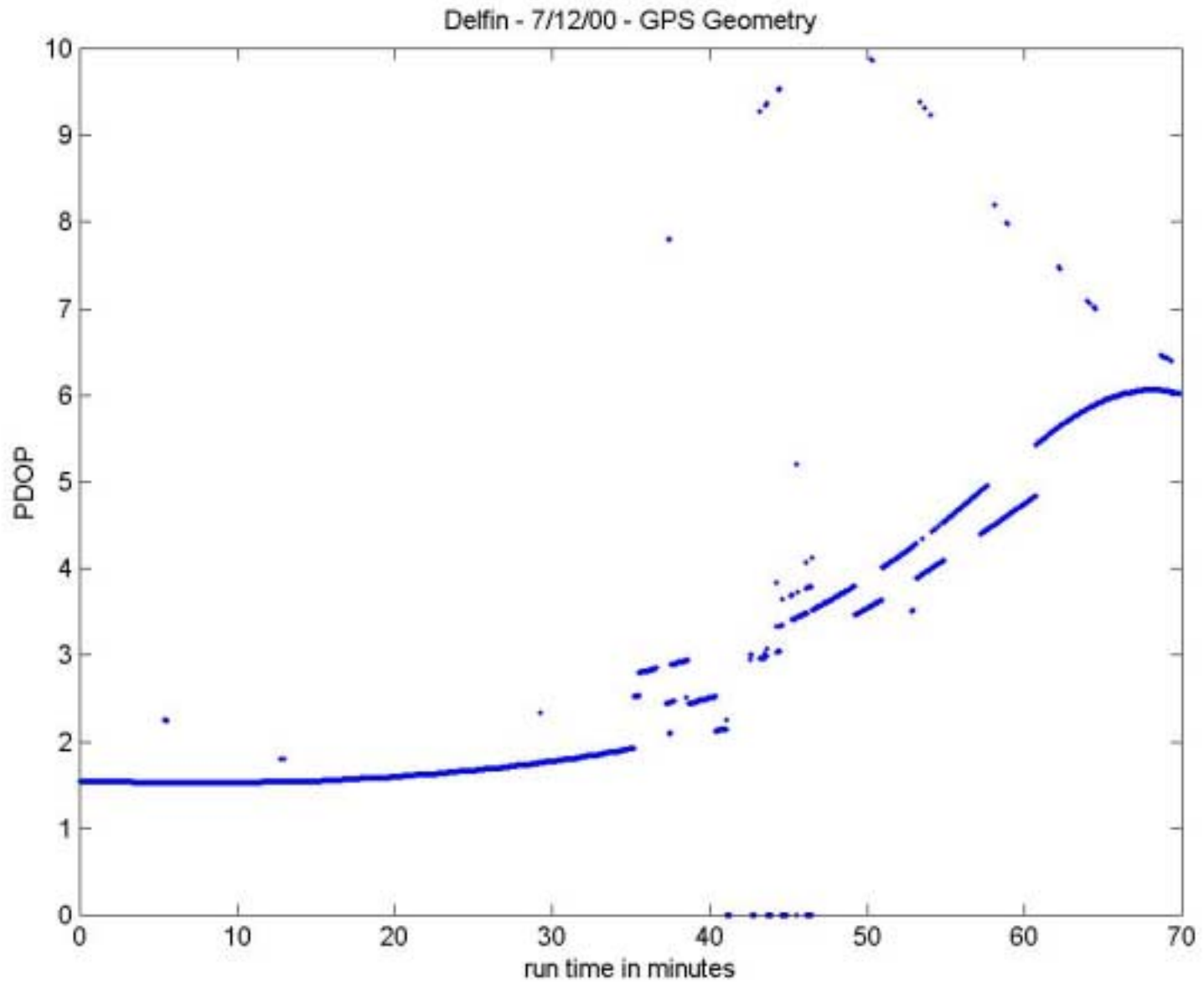


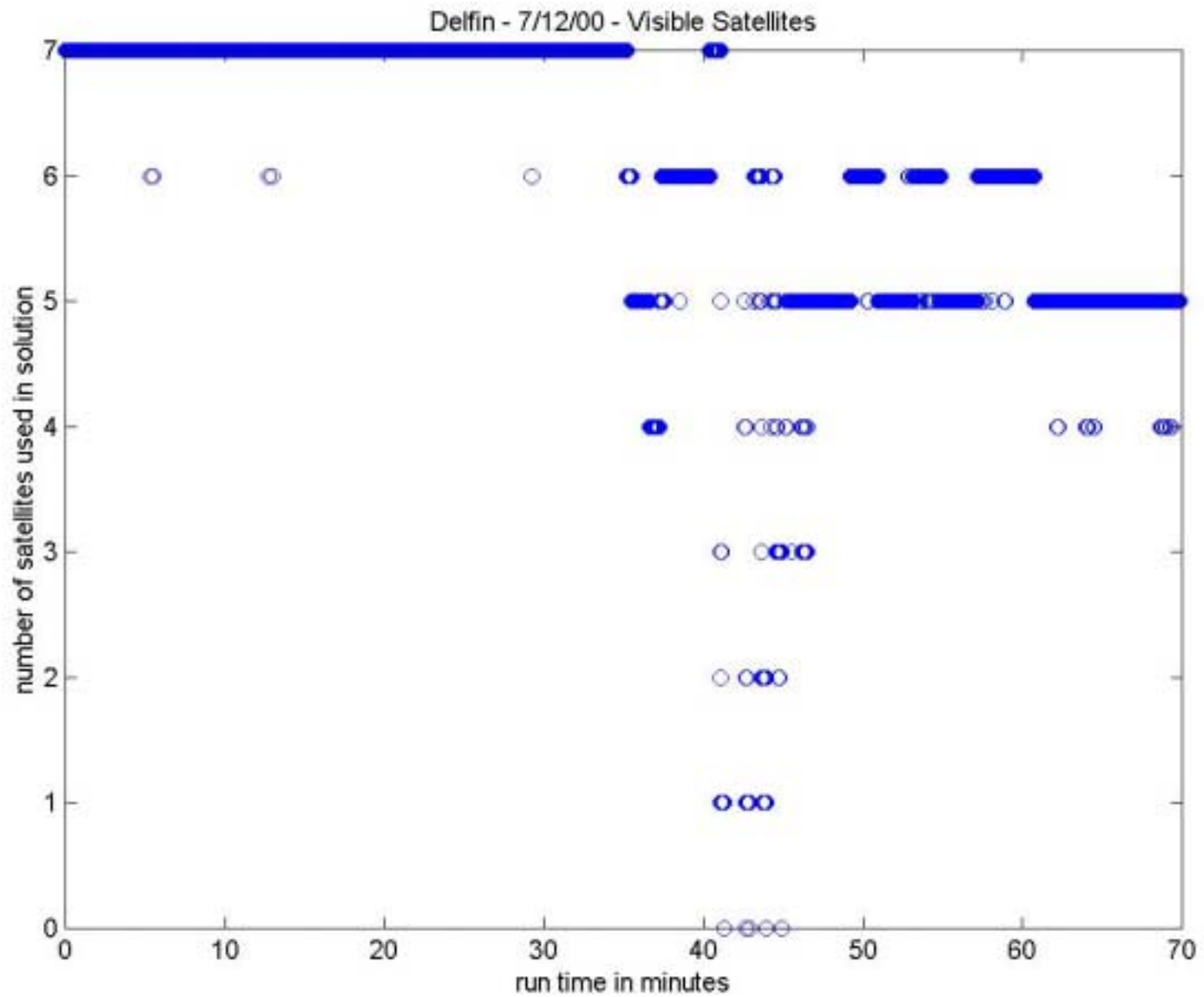


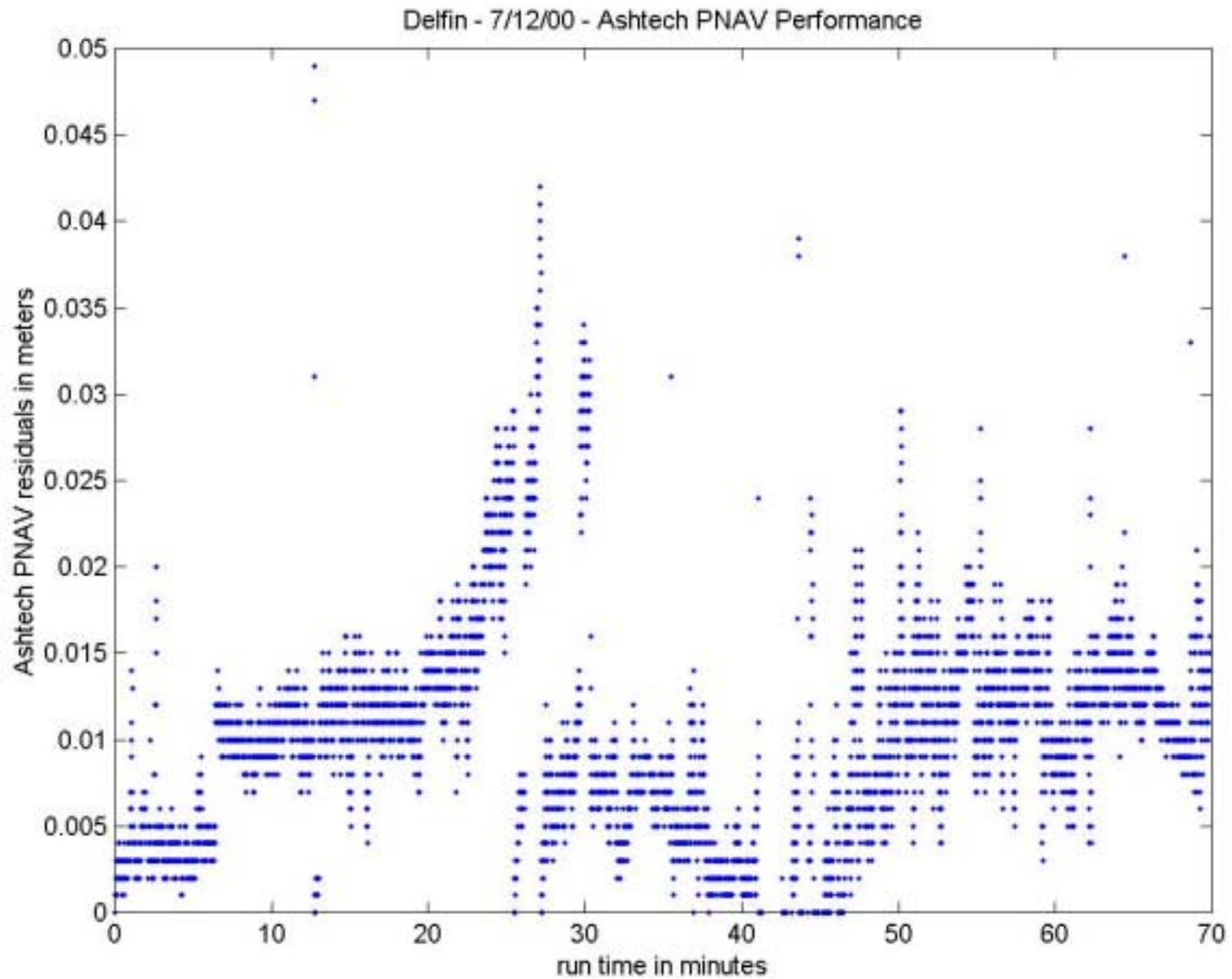


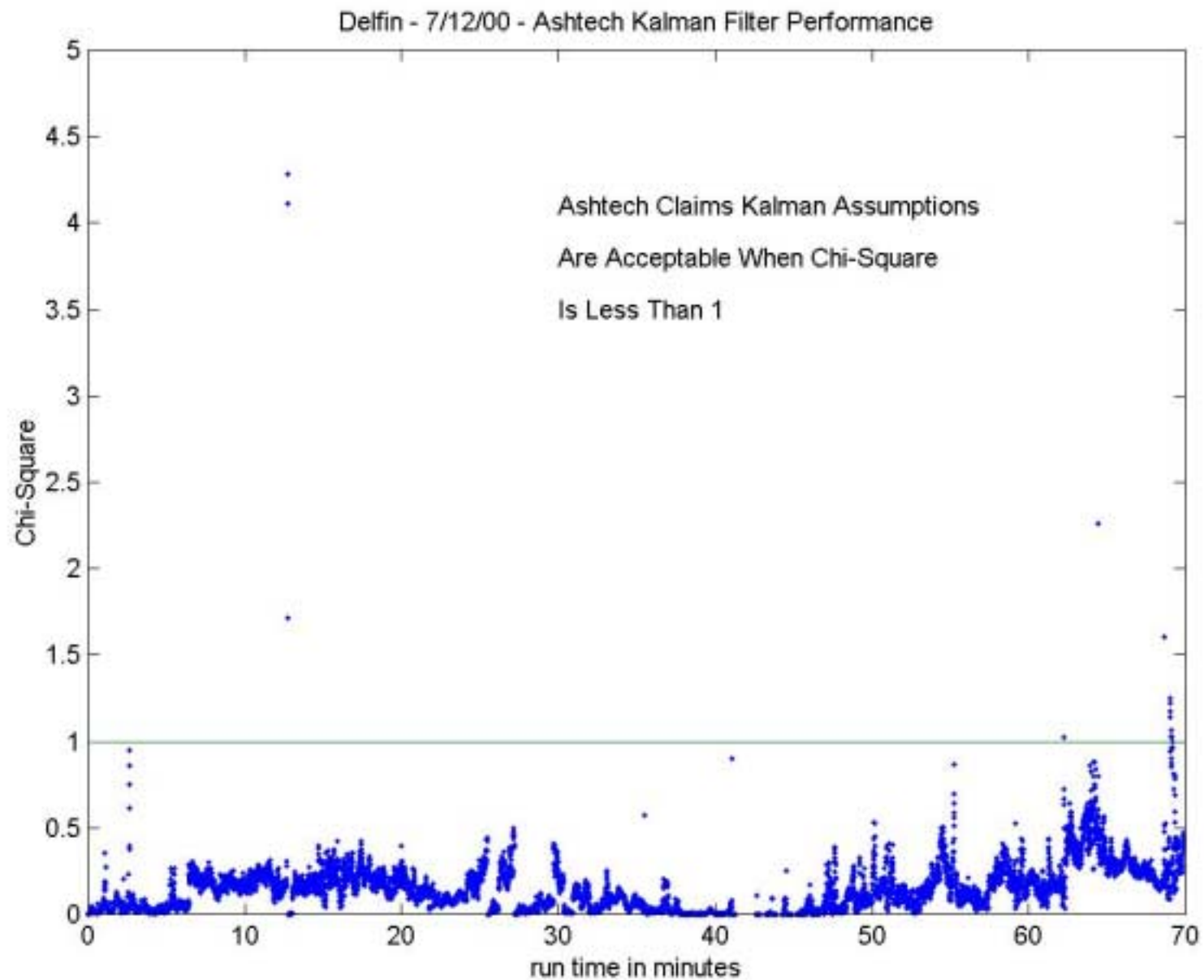












Conclusions

- Conventional truth reference system is not applicable in a high dynamic aircraft
- GPS receivers capable of high dynamics (such as the Ashtech G12) should be investigated
- Differential carrier-phase processing software should also be tuned for the dynamic environment
- Additional flight testing scheduled with G12's in the next couple of months